

LA-UR-20-20158

Approved for public release; distribution is unlimited.

Title: RETRO RX

Author(s): Deshpande, Alina

Intended for: Web

Issued: 2021-06-18 (rev.1)

Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Triad National Security, LLC for the National Nuclear Security Administration of U.S. Department of Energy under contract 89233218CNA000001. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.



Tech Snapshot Data Analytics

LA-UR-20-20158

Published: Jun 4, 2020

RETRO RX

*Rapid and easy to use tools for
understanding and responding to disease
outbreaks and re-emergence events*



SUMMARY

RETRO Rx is an R&D 100 Gold Award-winning suite of tools that provides a new class of analytics in the space between traditional epidemiological models and unanalyzed spreadsheets of data. Unlike traditional models, these tools provide analysts, scientists, practitioners, and decision makers a way to easily and effectively do sophisticated analyses using a simple user interface. AIDO guides users at the early stages of a disease outbreak by comparing the current parameters to historic outbreaks. RED Alert constructs a broad historical picture of disease incidence (recent outbreak included) to detect disease re-emergence at its earliest stages, locally and globally. RETRO Rx compiles data and presents analysis in a clear, concise visual format to support disease mitigation and prevention planning. Both are available currently as web-based apps. A prototype of the RED Alert mobile app with enhanced functionality is available for beta testing and AIDO mobile app development is planned.

BENEFITS

RETRO Rx fills a need in the disease surveillance community by taking minimal outbreak data and contextualizing it in historical infectious disease outbreak data to provide the user situational awareness and actionable information.

- One-stop shop for in-depth information about disease outbreaks
- Complementary to forecasting techniques
- Easy-to-use – no specific training needed
- Easy-to-interpret – the visual analytics paint their own picture
- Rapid analysis
- Accessibility on any platform gives global availability
- Based on real-world data

CONTACT

Amy Migliori
amymigliori@lanl.gov
505-667-2905



MARKET APPLICATION

Infectious disease surveillance is a \$450m market that has never been more relevant than during the COVID pandemic. There is a pressing need for rapid, easy to use and easy to interpret analytics that offer actionable information for data analysts, scientists, physicians, decision makers, educators and trainers, business travelers and the public. As global health data becomes more accessible, there is a need for tools that can use disparate data and perform rapid, real-time analysis for outbreak control and mitigation.



WHY WE ARE BUILDING RETRO RX

Los Alamos scientists found a gap in the space between traditional epidemiological models and large quantities of unanalyzed data that made it hard for non-experts to determine the impact of disease outbreaks and develop suitable mitigation strategies. RETRO Rx can be used by analysts, scientists, practitioners, decision makers, and the public via the internet. This toolkit requires minimal effort and expertise from users and brings together a wealth of data to produce actionable information: digestible, diverse visual analytics paired with detailed descriptions.



WHAT'S BEHIND OUR TECHNOLOGY

The RETRO Rx software suite hosts proprietary algorithms supported by a team of very talented and experienced scientists, engineers, and technicians who have extensive experience in disease surveillance, public health, epidemiology, computer science, and visual data analytics. RETRO Rx provides on-the-spot situational awareness regarding outbreak as well as tried and true mitigation strategies to a wide variety of stakeholders. These tools provide visuals to educate both public and policy makers on different possible outcomes and their socio-economic impact. The RETRO Rx software suite was recognized in 2019 with the R&D 100 Gold Award for Corporate Social Responsibility.



OUR COMPETITIVE ADVANTAGES

RETRO Rx is one of a kind technology that has the unique advantage of being usable by almost anybody. The following capabilities represent direct competitive advantages of RETRO Rx as compared to similar commercial software: 1) it is the first in the market place to provide diverse visual analytics paired with detailed descriptions; 2) innovative technology to analyze potential re-emergence of an infectious disease; 3) provides actionable information specific to the user's situation; and 4) provides a global application of analytics.



OUR TECHNOLOGY STATUS

The web apps for both AIDO and RED Alert are fully developed. Mobile app development for RED Alert is available for download and includes subnational level monthly data and corresponding algorithm (not available on the web app). Los Alamos scientists have validated the analytics inside the Laboratory. We looking for a partner through a license or a CRADA who develops and distributes software and would be interested in collaborating with the RETRO Rx team to further develop the software suite for commercial purposes. The current version of the RETRO Rx software suite is available to be used at: AIDO - <https://aido.bsvgateway.org/> RED Alert - <https://redalert.bsvgateway.org/>



PUBLICATIONS AND IP

Velappan N, et al. Analytics for Investigation of Disease Outbreaks: Web-Based Analytics Facilitating Situational Awareness in Unfolding Disease Outbreaks. JMIR Public Health Surveill. 2019 Feb 25;5(1):e12032. doi: 10.2196/12032. PMID: 30801254; PMCID: PMC6409513.

Parikh N, et al. Improving Detection of Disease Re-emergence Using a Web-Based Tool (RED Alert): Design and Case Analysis Study. JMIR Public Health Surveill. 2021 Jan 7;7(1):e24132. doi: 10.2196/24132. PMID: 33316766.

Chitanvis M, Daughton AR, et al. Development of a Supervised Learning Algorithm for Detection of Potential Disease Reemergence: A Proof of Concept. Health Secur. 2019 Jul/Aug;17(4):255-267. doi: 10.1089/hs.2019.0020. PMID: 31433278.

Analytics for Investigation of Diseases Outbreaks (AIDO) © 2017 Re-emerging Infectious Diseases Alert (RED Alert) © 2017

A brief introduction to RETRO Rx can be found at: <https://www.youtube.com/watch?v=8uEabZAmThQ&feature=youtu.be> R&D100 podcast about RETRO Rx

<https://www.rdworldonline.com/retro-rx-from-los-alamos-is-the-focus-of-episode-2-of-rd-100-the-podcast/>